AIR TRANSPORT IN NORTHERN CANADA

by

K.P. Peiffer

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AIR TRANSPORT

IN

NORTHERN CANADA

K.P. Peiffer
Vice President - Traffic Development

NORDAIR LTEE - NORDAIR LTD

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The only available references to central government policy with respect to our air transport system in Canada are found in the Trans-Canada Airlines Act of 1937, the policy statement of the Minister of Transport on October 20th 1966, when he dealt with the Regional Air Carrier Policy, and in the National Transportation Act, assented to in February 1967.

Under the Trans-Canada Airlines Act authority was conferred upon Air Canada in the following manner:

> "The Governor in Council may authorize the Minister to enter into a contract with the Corporation (to be know as the Trans-Canada contract) for the organization, operation and maintenance by the Corporation of lines of aircraft (to be know as the Trans-Canada Lines) for the speedy and efficient transport of passengers, and goods across Canada and between and within the several provinces thereof, and between points in Canada and points outside of Canada, over routes wholly within or partly within and partly outside of Canada".

The Statement of Principles for Regional Air Carriers of October 1966 by the Minister of Transport stated:

"The role of regional air carriers is to operate local or regional routes.........................., and to provide regular and scheduled service into the North".

The National Transportation Act declares:

"That an economic, efficient and adequate transportation system making the best use of all available modes of transportation at the lowest total cost is essential to protect the interests of the users of transportation and to maintain the economic well-being and growth of Canada, and that these objectives are most likely to be achieved when all modes of transport are able to compete under conditions ensuring that having due regard to national policy and to legal and constitutional requirements

(a) regulation of all modes of transport will not be of such a nature as to restrict the ability of any mode of transport to compete freely with any other modes of transport;

(b) each mode of transport, so far as practicable, bears a fair proportion of the real costs of the resources, facilities and services provided that mode of transport at public expense;

(c) each mode of transport, so far as practicable, receives compensation for the resources, facilitie and services that it is required to provide as an imposed public duty; and

(d) each mode of transport, so far as practicable, carries traffic to or from any point in Canada under tolls and conditions that do not constitute

  (i) an unfair disadvantage in respect of any such traffic beyond that disadvantage inherent in the location or volume of the traffic, the scale of operation connected therewith or the type of traffic or service involved, or

  (ii) an undue obstacle to the interchange of commodities between points in Canada or unreasonable discouragement to the development of primary or secondary industries or to export trade in or from any region of Canada or to the movement of commodities through Canadian ports;

and this Act is enacted in accordance with and for the attainment of so much of these objectives as fall within the purview of subject matters under the jurisdiction of Parliament relating to transportation."

Within this framework of policy which gives no recognition to the essential social role of transportation in the North, air services in and to the Northwest Territories have been established over the years on an ad-hoc basis unassisted by much planning or direction from the government. Only in the last three to five years has there been evidence of planning by the private sector, and some government agencies.

Historically air-routes into and within the Canadian North have developed in a South-North direction, following the natural lines of supply of major industrial or military projects from Southern manufacturing or population centers to distribution centers in the North. In this way they have initially satisfied only two of the major objectives of Northern activity, ie., the defense requirement, and the economic activity associated with resource exploration. The social objectives associated with human resources in the Arctic, and the material needs of its indigenous population and their future as Canadian citizens were initially served by such air-routes only as a secondary objective, and almost on an incidental basis. Where such air-routes have been developed as unit toll services (1) on a scheduled basis with reasonable frequency, they have gradually become essential to the social well being of persons living in the Canadian North.

(1) Unit Toll Service are services for which charges are established per unit carried: ie. per passenger or per lb of freight.

Three major Northern air services supplying the needs of the Eastern, the Central, the Western and the High Arctic have been developed in this fashion (see Map No. 1).

The air-route between Edmonton - Yellowknife - Inuvik/Cambridge Bay, one of the oldest established aerial supply routes into the Arctic, sections of which operated on a scheduled basis as early as 1946, initially served the concentration of resource exploration in the Great Slave Lake area, the military objectives associated with the function of Cambridge Bay as a Western supply distribution point for the DEW-Line (1) and the logistic needs of the population concentration in the Mackenzie River delta and along the Mackenzie River generally.

Air service between Montreal - Fort Chimo - Frobisher Bay and Resolute Bay has developed along similar lines. While initially serving mainly the resource exploration objectives on the Ungava Peninsula, the route was soon extended to Frobisher Bay, originally the distribution base for the Eastern sector of the DEW-Line and now the main center of government activity in the Eastern Arctic. In the early 'Sixties this

(1) Distant Early Warning Line.

route was extended further to Hall Beach and Resolute Bay, center of the Joint Arctic Weather Station System, and jump-off base for the first phase of oil exploration activity in the High Arctic.

Service from Winnipeg through Churchill is the main aerial access route to the Central North or the Keewatin district. Originally, the service supported primarily a variety of economic activities connected with the Port of Churchill including the military and scientific activity there. Today its primary function is the support of the population in the Keewatin district.

The development pattern of all three routes has at least four things in common:

Firstly: They have all developed along the supply lines of major projects associated with military or economic objectives in the Arctic.

Secondly: They have all developed from sporadic charter services in their initial stage to scheduled service with gradually increased frequency. The transition from charter service to scheduled service has in most cases been brought about either by the fact that the size of the projects served, soon made the "one shipper - one consignee" concept impractical, or by the fact that the projects served required ancilliary services which could no longer be matched with the requirements of the charterer. But whatever the cause, the transition from charter to schedule has produced results hardly imagined at the outset. Mail began to move along the scheduled routes bringing the advantage of reliable postal service to people which before had relied on the occasional charter flight for contact with the South. Food, dry goods, and other necessities of subsistence were landed at Northern centers with sufficient regularity to make it possible to programme their distribution to smaller surrounding communities. Scheduled air services of the feeder-line variety are now established at Frobisher Bay, Resolute Bay, Churchill, Yellowknife and Inuvik, serving a total of fifty-one communities in the Northwest Territories with DC-3 aircraft and with turbo-prop equipment such as the Skyvan and the Twin-Otter. (see Table I) Medical and administrative services have developed along the three major

Arctic supply routes and a pool of skills and knowledge connected with work in the Canadian Arctic has established itself at or close to the Southern base of these routes. The extent to which this is true can be seen from the fact that the majority of passenger travel on the main Arctic supply routes is en-route traffic and originates or terminates at or close to the Southern base of these routes. (see table II, 1,2,3).

Thirdly: All three main routes are today operated with modern jet or turbo-prop equipment. There are no communities of a similar size to Frobisher Bay, Yellowknife, or Inuvik in the South today which have the benefit of comparable regularly scheduled jet service.

Fourthly: All three routes have developed to the point where they are an integral and important part of life in the North and are essential to Northern development.

With the introduction of jet aircraft on the main Northern supply routes in 1968, the character of Northern air transportation has changed dramatically.

Pacific Western Airlines and Nordair both use the Boeing 737 airplane convertible to part cargo - part passenger configuration and capable of landing on gravel runways on their Northern scheduled services. This equipment has introduced reliability to the Arctic not previously envisaged and has provided a whole new concept of air transportation in the North.

Where only two years ago scheduled service between Frobisher Bay and Montreal operated three times a week and would take six to seven hours with piston engine aircraft such as the DC-4, DC-6 or Super Constellation this same trip now takes three hours on board a modern jet liner and frequency is six times per week. Where once a trip from a Coastal settlement in the Western Arctic to Edmonton was dependent on the sporadic operation of a charter flight to a point where connection to a flight South was available, this same trip can today be made on a scheduled basis over its entire length. Where once foodstuffs and perishables had to be unloaded by hand, exposing goods to severe temperature conditions, today the modern freight handling equipment assures the transfer from aircraft to warehouse with minimum exposure to the elements.

The benefits which derive from frequency of scheduled air service, not only from a point of view of logistics but also from a social point of view, are well know and particularly well understood in the North.

The Federal Government, through its regulatory agency, the Air Transport Committee of the Canadian Transport Commission, formely the Air Transport Board, has until recently played a passive role in the development of Northern air services. In 1968, under the Chairmanship of the Honourable J.W. Pickersgill, a series of hearings were held by the Air Transport Committee in Yellowknife and Frobisher Bay, to review the requirements for and adequacy of existing and proposed commercial air services and to consider some seven specific applications for licences or amendments of licences for the operations of commercial air services in this area. This represented the first Hearing of a Committee of the Canadian Transport Commission to be held in the Northwest Territories. Subsequently, the Committee issued a Decision, entitled "General Conclusions of the Air Transport Committee Resulting from the Conduct of a Review of the Commercial Air Services in the Northwest Territories", in which it recognized the benefits of scheduled air services and contrasted them to charter operations in these words: "If economical, viable air services are to be developed and maintained in the Northwest Territories, it follows that departments and agencies of government should, wherever possible, use the regular air services in the North and that short-term economies which might result from chartering services from southern Canada should be balanced against the long-term economy of having efficient and economical services available to the North on a year-round basis." In this same decision it is of interest to note that the Committee also recognized that an East to West service linking Frobisher Bay and Yellowknife would be desirable, if economically feasible. But, at the same time emphasized that such a route would not be eligible for subsidy either then or in the foreseeable future. The Committee also observed that: "Historically, the basis of air service in the North is that of three regional carriers, one operating from Montreal to the Eastern Arctic, another from Winnipeg to the Central Arctic, and the third from Edmonton to the Mackenzie Valley and the Coppermine area. All three services are essential to effective air service within the Northwest Territories. It is, therefore, a great importance that these carriers remain economically viable".

In the light of this pertinent observation and directive, it is surprising that the Federal Government is heavily involved in Northern air-freighting and transport operations on a charter or contract basis through its Crown Corporation, Eldorado Mining, as well as through its substantial participation in Panarctic's oil exploration programme.

There are still many, perhaps too many, air services in the North operated on a regular or irregular basis by charter or contract. These services are operated for the convenience and benefit of one customer, and while they may offer some rate advantages to this customer, they are of no social benefit to the area which they serve. A case in point is the lateral DEW-Line resupply operation, which for many years has linked the Eastern and Western Arctic. As it serves military needs exclusively, this service has done nothing towards developing the East-West air service link now sought by the government of the Northwest Territories.

Contract operations such as the DEW-Line do not appear to warrant the use of modern aircraft as the operation to this day utilizes DC-4, C-46 and DC-3 aircraft, although it has been demonstrated how the DEW-Line resupply could be accomplished using a combination of available scheduled services with modern jet equipment and to a much lesser degree charter aircraft.

Also management personnel of the Department of Indian Affairs and Northern Development and now those of the Northwest Territorial Government and the Department of National Health and Welfare historically have used charter flights for their regular inspection trips. In addition, the government uses military transport for "VIP" visitors or for special trips in many cases where scheduled services are available.

So long as these practices continue the by-product benefits to the residents of the North, which flow from scheduled air services will not be realized and the longer it will take to "open up the North".

Notwithstanding the foregoing, it must also be stated that during the last two years government agencies have made increased use of scheduled services for movement of cargo North on a regular basis throughout the year. However, a substantial amount of cargo still moves by sea in the two to three months that the ports are free of ice. It must be assumed that the decision not to make more use of the available air services is based mainly on the cost differential between air and sea. But, if a proper air transport system with lower unit rates is to emerge in the North consideration will have to be given to moving more cargo by air. The increase in cargo movement would eventually result in a decrease in the cost per unit, as it would permit the Northern Carrier to make more efficient use of the productivity of his jet aircraft. Consideration will also have to be given to the recommendations of Air Transport Committee Decision No. 2624 particularly where it suggests that departments and agencies of government should, whenever possible, make use of the regular air services provided in the North. However, this should also include the use of scheduled services by Crown Corporations and Military Agencies. Only through such planned use of the existing transport facilities will it be possible to build up a system of scheduled services from which the maximum social and economic benefits for the North will result.

The importance of improving aids to Air Navigation and introducing weather reporting services so as to achieve more reliability in the Air Service provided with smaller aircraft to the more isolated settlements in the North are covered by separate papers but brief mention is made here of these matters. In Decision Serial No. 2624, the Committee noted that aids to aerial navigation did not exist over a considerable part of the most direct route between Yellowknife and Frobisher, and it seemed to the Committee that careful study should be given by the Commission in consultation with the Department of Transport to the relative cost and benefits of providing such aids. To our knowledge only few steps have been taken to improve Air Navigation facilities in this area nor has the recommended study commenced.

In the Decision previously referred to, the Canadian Transport Commission recognized the need for airport improvement, when it pointed out that: "One of the difficulties of providing economical, efficient and adequate service in the Northwest Territories is the lack, in many of the settlements, of airstrips available on a year-round basis. It is the intent of the Commission to have consultations with the Research Division of the Commission and other appropriate Federal Government Departments on this subject." Some action has taken place since this Decision, but there is still much room for improvement. Except at main airports such as Frobisher, Resolute, Inuvik and Yellowknife the airports are not under the management of the Ministry of Transport. Some airports which are used for scheduled air services are under United States Air Force control and some are under Northwest Territories Government jurisdiction, others have been developed and are maintained at least in part on a voluntary basis by local residents.

A programme for the improvement of certain airports was announced by the Minister of Indian Affairs and Northern Development on June 8th. Design is by the Ministry of Transport and construction is carried out by the engineers of the Canadian Armed Forces. Priorities have been set by D.I.A.N.D. and work has already commenced at Pangnirtung, a settlement which currently has a perfectly adequate airstrip of 1700 feet in length and is receiving scheduled service three times weekly with aircraft capable of STOL performance. On the other hand at least two Northern settlements which at present do not have any airstrips at all, namely Port Burwell and Lake Harbour, are not included in the programme.

The Northwest Territories of Canada with an area of approximately 1,200,000 square miles and a population of only 32,000 (1) is the largest under developed area at least in the Western World. The users and the operators of the transport systems in the Canadian North are greatly concerned over the large sums of the Canadian taxpayer's money being spent on aid

(1) 1969 estimates as per 1969 Annual Report of the Government of the Northwest Territories.

to so called under-developed countries both as direct foreign aid and through the medium of the International Development Agency. One must wonder whether the allocation of a small percentage of such foreign aid funds to Northern Airports, aids to navigation and if necessary assistance towards the development of a transportation network spanning our entire North country would not be more advantageous to Canadians.

While the introduction of modern equipment and the establishment of scheduled services to isolated settlements together with increased frequency between North and South has resulted in an overall reduction in the cost of transportation,these benefits are sometimes overshadowed by the fact that fares and rates for Northern air services are generally higher than those for equivalent mileage in the South. It is sometimes not recognized that practically all elements of cost of airplane operation in the North are considerably higher than in the South. For example:

Fuel costs as much as 78 percent more than at points in Southern Canada (1); labour costs inflated by Northern allowances and other fringe benefits; low utilization of ground equipment and station personnel caused by low flight frequencies and steadily increasing station costs in the North brought about by the gradual increase of the cost of all services, from airport charges and electricity to garbage disposal.

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(1) At Frobisher Bay, jet fuel for use on domestic flights costs 78 percent more than in Montreal. The average cost for turbo-fuel to the three Regional Carriers providing Northern services is 40 percent higher than the average cost of turbo-fuel to CPAir and Air Canada. (Source DBS Catalogue No. 51-002, January - March 1970)

Northern rate structures also reflect such anomalies experienced in Northern transportation as uni-directional freight traffic flow and significant seasonal variations in load factors. The cost-contributing aspects of seasonal variation in utilization of equipment on Northern services exceeding +20 percent and -20 percent of the average is obvious. Various devices have been used to equalize this seasonal utilization. Nordair has achieved some success to equalize this by attracting to air movement a sizeable portion of supplies previously moved by sealift. Nordair achieved this through a combination of incentive rate structures, combined with transportation cost economies associated with reduced inventory and warehousing costs, reduced handling and spoilage, and reduced packaging requirement; all of which would derive from an even year-round air supply programme. This year-round flow of traffic permits rate levels substantially lower than what is customary where seasonal traffic prevails. Nordair's ton/mile revenue, as a result of its incentive rate structure, is 32 percent lower than the average for the Regional Carriers (1). Unfortunately, even this incentive rate structure has not eliminated seasonal traffic altogether, mainly because traditional purchasing practices are still partially meeting sealift requirements. Therefore, Northern carriers must compensate the resultant problem of seasonal and periodic under-utilization of their equipment on scheduled services to and from the North on weekdays by operating charters to the South on weekends. In fact, if this kind of additional utilization were not possible, jet service, as we know it today, would not be available, at least, in the Eastern Arctic.

The cost of Northern operations must also reflect the distance of alternate airports from the intended destination insofar as this requires the carrying of fuel reserves which reduce the payload and the productivity of the aircraft.

The foregoing makes it clear, that Northern rates are established as a direct function of the costs which are experienced in this type of operation, and, fares and rates cannot come down, unless ways are found to reduce costs. It is possible that in some areas efficiency could be improved, even though on the average the Regional carriers providing Northern service are quite

(1) DBS Catalogue No. 51-001 (July 1970) Table 5, Item 25.

efficient, and, in certain respects more so than the trunk lines operating in the South (1). But some of the elements of cost are outside of the control of the carriers, for example, the cost of depreciation of equipment and the financing charges are both extremely high and are related to the capital cost of the aircraft.

This capital cost of jet aircraft is therefore worthy of consideration. They cost about $6,000,000. per unit including spare parts, handling equipment, special tools and sales tax. The financing of these aircraft has placed great strain on the resources and credit available to regional carriers. The cost of financing to regional carriers is approximately 10½% which is 4% more than the cost of Air Canada's aircraft financing because the rate charged that Crown Corporation by the government is 6½%.

A similarly ironic situation is, that it is not possible for a Canadian Air Carrier operating in the North to purchase the DHC-6 Twin-Otter, a Canadian developed and manufactured aircraft, ideally suited for short airstrip operation, on terms as favorable as are available to a foreign buyer through the facilities of the Export Credit Insurance Corp., a Canadian Crown Corporation.

(1) Operating Revenue per Employee for Air Canada and CPAir during the first seven months of 1970 was $15,570., while the three Regionals serving the North averaged $19,750. per employee.

If this aircraft had been in use in the Canadian North before it was in use in foreign countries, its export sales might have been favorably influenced and it could have had a profound influence upon the earlier mentioned airport development programme in the North.

Acquisition of equipment is an area in which the Federal Government recognized the desireability of assisting Regional Carriers providing air service in the North. The Minister of Transport in the Summary of the October 1966 Statement of Principles stated:

> "Steps will be taken to assist regional carriers to deal with acquisition of aircraft by development of a scheme for consultation between government and the carriers regarding plans for new aircraft; and by a special investigation designed to explore the possibility of developing a joint approach to this problem on the part of the carriers."

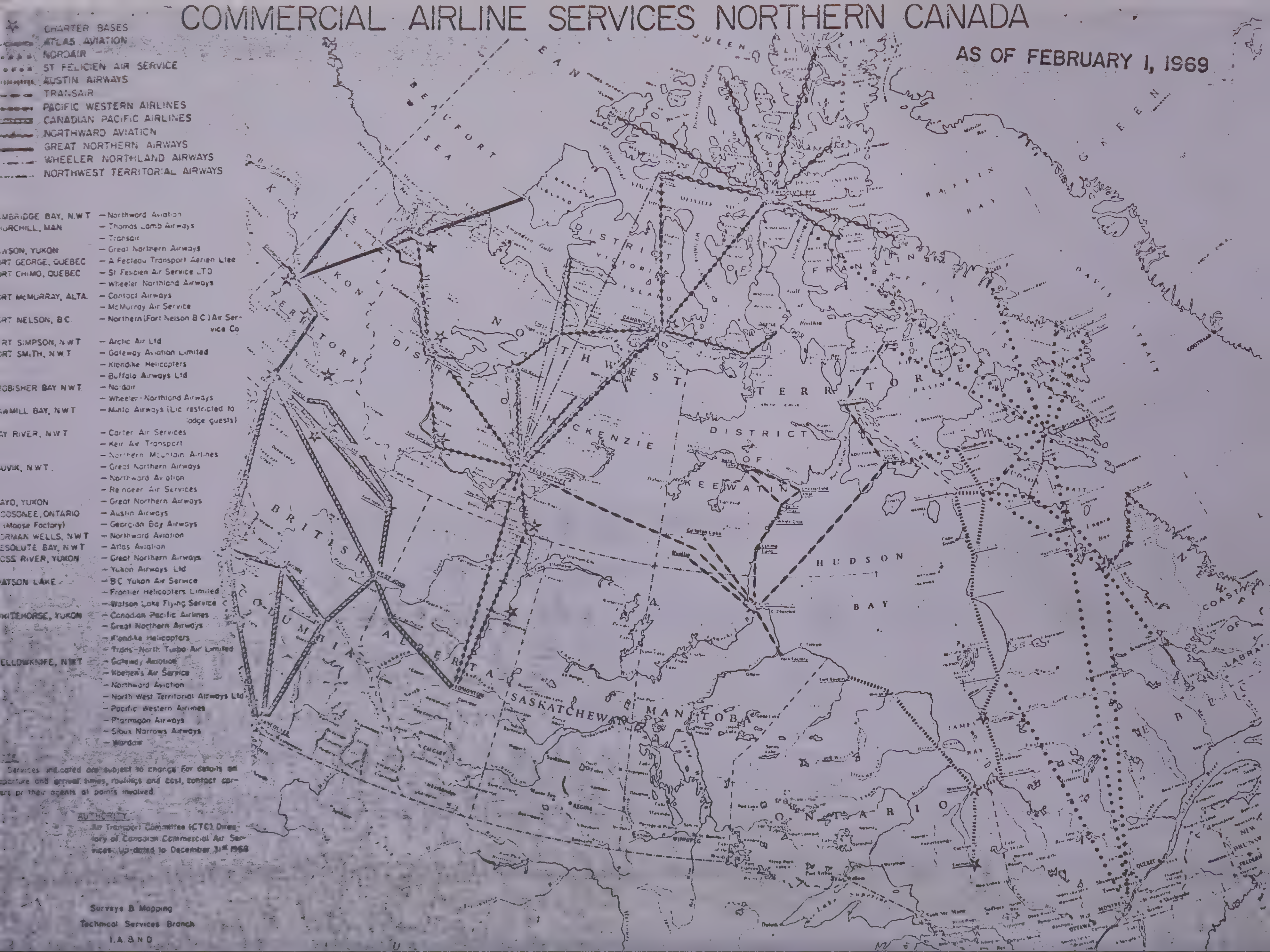
No such assistance has been forthcoming, nor, to our knowledge is it under consideration. The climate, in fact, created to a large degree by the inconsistent application and the sporadic implementation of the Regional Air Carrier Policy has made the profitability of the Northern Air Carriers unattractive to the investing public which in turn has made the financing of new aircraft both costly and difficult.

In summary, the Regional Carriers providing scheduled air services to and in the North occupy a position of considerable importance to Canada as a whole and to the vast area of the Northwest Territories in particular. It is apparent from the foregoing that Northern transportation would benefit from a closer working relationship between the carriers and both the Central government and the government of the Northwest Territories. It is equally apparent that the economic health of the carriers should be of prime concern if they are to maintain the capability of providing adequate air services to the North.

The Ministry of Transport, the Department of Indian Affairs and Northern Development and the Governments of the Yukon and the Northwest Territories must therefore be congratulated to organize and call together at this time this Arctic Transportation Conference to discuss Northern Transportation and hopefully resolve the problems which are besetting it today.

COMMERCIAL AIRLINE SERVICES NORTHERN CANADA

AS OF FEBRUARY 1, 1969



MBRIDGE BAY, N.W.T	— Northward Aviation
URCHILL, MAN	— Thomas Lamb Airways — Transair
WSON, YUKON	— Great Northern Airways
RT GEORGE, QUEBEC	— A Fecteau Transport Aerien Ltee
RT CHIMO, QUEBEC	— St Felicien Air Service LTD — Wheeler Northland Airways
RT McMURRAY, ALTA.	— Contact Airways — McMurray Air Service
RT NELSON, B.C.	— Northern (Fort Nelson B.C.) Air Service Co
RT SIMPSON, N.W.T	— Arctic Air Ltd
RT SMITH, N.W.T	— Gateway Aviation Limited — Klondike Helicopters — Buffalo Airways Ltd
ROBISHER BAY N.W.T.	— Nordair — Wheeler-Northland Airways
WMILL BAY, N.W.T	— Minto Airways (Lic restricted to lodge guests)
Y RIVER, N.W.T	— Carter Air Services — Keir Air Transport — Northern Mountain Airlines
UVIK, N.W.T.	— Great Northern Airways — Northward Aviation — Reindeer Air Services
AYO, YUKON	— Great Northern Airways
OSONEE, ONTARIO (Moose Factory)	— Austin Airways — Georgian Bay Airways
RMAN WELLS, N.W.T	— Northward Aviation
ESOLUTE BAY, N.W.T	— Atlas Aviation
OSS RIVER, YUKON	— Great Northern Airways — Yukon Airways Ltd
ATSON LAKE	— BC Yukon Air Service — Frontier Helicopters Limited — Watson Lake Flying Service
HITEHORSE, YUKON	— Canadian Pacific Airlines — Great Northern Airways — Klondike Helicopters — Trans-North Turbo Air Limited
ELLOWKNIFE, N.W.T	— Gateway Aviation — Koehen's Air Service — Northward Aviation — North West Territorial Airways Ltd — Pacific Western Airlines — Ptarmigan Airways — Sioux Narrows Airways — Wardair

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Services indicated are subject to change. For details on departure and arrival times, routings and cost, contact carriers or their agents at points involved.

AUTHORITY

Air Transport Committee (CTC) Directory of Canadian Commercial Air Services. Up-dated to December 31st 1968

Surveys & Mapping
Technical Services Branch
I.A.& N.D.

TABLE I

UNIT TOLL SERVICES AVAILABLE FROM MAJOR DISTRIBUTION CENTERS IN THE NORTH(1)

Inuvik, N.W.T. (serves 9 different communities)	-	Fort McPherson	Northward Aviation Ltd	Class 2
		Aklavik	" " "	"
		Arctic Red River	" " "	"
		Tuktoyaktuk	" " "	"
	-	Old Crow	Great Northern Airways	Class 3
		Sachs Harbour	" " "	"
		Clinton Creek	" " "	"
		Tuktoyaktuk	" " "	"
		Dawson	" " "	"
	-	Mayo	" " "	Class 2
		Dawson	" " "	"
Yellowknife (serves 16 different communities)	-	Coppermine	Northward Aviation Ltd	Class 3
		Holman Island	" " "	"
	-	Hope Lake	North West Territorial Airways Ltd	Class 3
		Port Radium/Sawmill Bay	" " " "	"
		Coppermine	" " " "	"
		Holman Island	" " " "	"
		Melville Island	" " " "	"
		Lady Franklin	" " " "	"
		Cambridge Bay	" " " "	"
	-	Fort Simpson	Pacific Western Airlines(2)	Class 1
		Wrigley	" " "	"
		Norman Wells	" " "	"
	-	Fort Resolution	" " "	Class 2
		Fort Smith	" " "	"
		Fort Chipewyan	" " "	"
	-	Cambridge Bay	" " "	Class 2
		Resolute Bay	" " "	Class 3
	-	Snowdrift	Ptarmigan Airways Ltd	Class 3
		Fort Reliance	" " "	"

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(1) "Directory of Canadian Commercial Air Services," Canadian Transport Commission, Air Transport Committee, 1970.

(2) Based on published schedules.

Churchill (serves 8 different communities)	-	Eskimo Point	Transair/Midwest(1)	Class 3
		Whale Cove	" "	"
		Chesterfield Inlet	" "	"
		Rankin Inlet	" "	Class 2
		Baker Lake	" "	"
		Coral Harbour	" "	"
		Repulse Bay	" "	Class 3
		Hall Beach	" "	"
Frobisher Bay (serves 10 different communities)	-	Broughton Island	Nordair Ltd(1)	Class 3
		Pangnirtung	" "	"
		Cape Dyer	" "	"
		Cape Dorset	" "	"
		Coral Harbour	" "	"
		Clyde River	" "	"
		Igloolik	" "	"
		Hall Beach	" "	"
	-	Lake Harbour	Wheeler-Northland	Class 3
		Wakeham Bay	" "	"
Resolute Bay (serves 9 different communities	-	Mould Bay	Atlas Aviation Ltd	Class 3
		Isachsen	" " "	"
		Eureka	" " "	"
		Arctic Bay	" " "	"
		Grise Fjord	" " "	"
		Pond Inlet	" " "	"
		Melville Island	" " "	"
		Strathcona Sound	" " "	"
		Mayda Lake	" " "	"

(1) Based on published schedules

TABLE II

ORIGIN & DESTINATION OF PASSENGERS
TRAVELLING ON MAJOR NORTHERN SUPPLY
ROUTES IN 1969(1)

1. Montreal - Fort Chimo - Frobisher Bay - Resolute Bay

Between/and	En-Route	Off-Route	Total
Fort Chimo			
British Columbia		10	
North West Territories			
Frobisher Bay	80		
Yellowknife		5	
Manitoba		20	
Ontario		60	
Quebec			
Montreal	1,845		
Quebec City		100	
	1,925 (92%)	195 (8%)	2,120 (100%)
Frobisher Bay(2)			
Alberta		345	
British Columbia		10	
North West Territories			
Resolute Bay	335		
Fort Smith		5	
Yellowknife		35	
Manitoba		85	
Maritime Provinces		65	
Ontario		1,075	
Quebec			
Chibougamau		60	
Montreal	5,055		
Quebec City		65	
North Shore		25	
Val d'Or		10	
Saskatchewan		20	
Yukon		20	
	5,390 (75%)	1,820 (25%)	7,210 (100%)

(1) Based on DBS, Aviation Statistic Branch, O & D Domestic 1969

(2) O & D do not include trips via Frobisher to Eastern Arctic settlements served from Frobisher Bay.

1. Montreal - Fort Chimo - Frobisher Bay - Resolute Bay (Cont'd)

Between/and	En-Route	Off-Route	Total
Resolute Bay(1)			
Ontario		295	
Quebec			
Montreal	1,320		
Quebec City		20	
Maritime Provinces		10	
	1,320 (80%)	325 (20%)	1,645 (100%)
TOTAL	8,635 (81%)	2,340 (19%)	10,975 (100%)

2. Winnipeg - The Pas - Thompson - Churchill(2)

Between/and	En-Route	Off-Route	Total
Churchill			
Alberta		280	
British Columbia		110	
Manitoba			
Brandon		5	
Dauphin		30	
Flin Flon		80	
Lynn Lake		155	
The Pas	885		
Thompson	1,650		
Winnipeg	7,195		
Maritime Provinces		75	
North West Territories			
Eastern Arctic		30	
Central Arctic		25	
Western Arctic		145	
Ontario		1,210	
Quebec		285	
Saskatchewan		195	
TOTAL	9,730 (79%)	2,625 (21%)	12,355 (100%)

(1) O & D do not include trips on PWA service via Yellowknife.

(2) Based on major routings in 1969, according to published schedules.

3. (Calgary) - Edmonton - Yellowknife - Norman Wells - Inuvik - Cambridge Bay

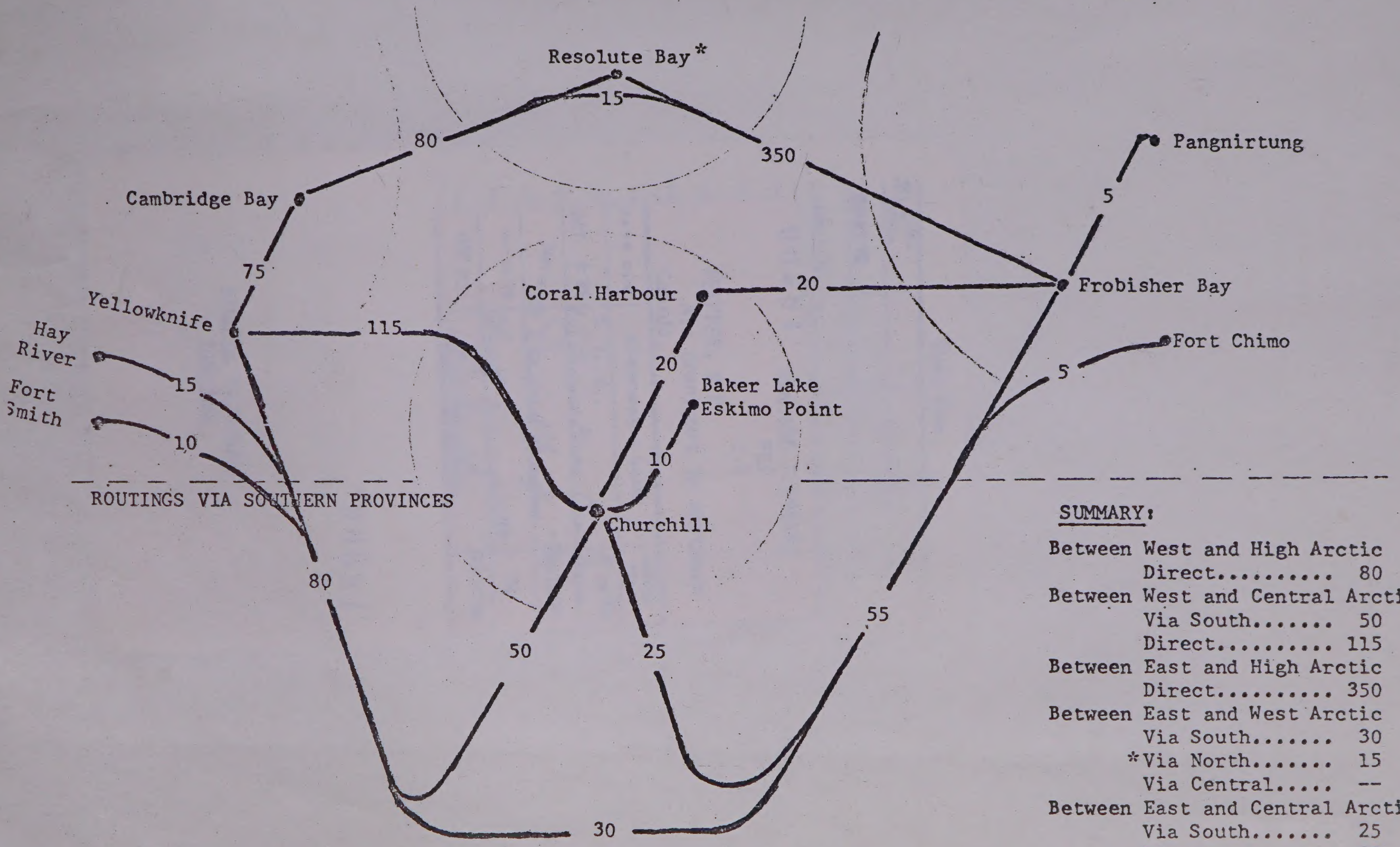
Between/and	En-Route	Off-Route	Total
Cambridge Bay			
Alberta			
Calgary	20		
Edmonton	850		
Rainbow Lake		10	
British Columbia		25	
Manitoba		10	
North West Territories			
Fort Simpson		10	
Fort Smith	110		
Hay River	30		
Yellowknife	505		
Ontario		40	
Quebec		20	
Yukon		10	
	1,515 (92%)	125 (8%)	1,640 (100%)
Inuvik			
Alberta			
Calgary	470		
Edmonton	5,005		
Fort McMurray	15		
Grand Prairie		10	
Lethbridge		5	
British Columbia		255	
Manitoba		50	
Maritime Provinces		5	
North West Territories			
Fort Smith	260		
Hay River	395		
Norman Wells	680		
Yellowknife	1,695		
Other, MacKenzie District		230	
Ontario		590	
Quebec		80	
	8,520 (87%)	1,225 (13%)	9,745 (100%)

3. (Calgary) - Edmonton - Yellowknife - Norman Wells - Inuvik - Cambridge Bay (Cont'd)

Between/and	En-Route	Off-Route	Total
Norman Wells			
Alberta			
Calgary	125		
Edmonton	1,745		
British Columbia		30	
Manitoba		10	
North West Territories			
Fort Smith	135		
Hay River	90		
Yellowknife	530		
Other, MacKenzie District		60	
Ontario		50	
Quebec		20	
	2,625 (93%)	170 (7%)	2,795 (100%)
Yellowknife			
Alberta			
Calgary	720		
Edmonton	17,745		
Fort McMurray	55		
Peace River	10		
Rainbow Lake		30	
British Columbia		1,910	
Manitoba		775	
Maritime Provinces		80	
North West Territories			
Fort Smith	3,685		
Hay River	4,140		
Resolute Bay	50		
Other:			
MacKenzie District		1,090	
Western Arctic		10	
Central Arctic		10	
Eastern Arctic		40	
Ontario		1,560	
Quebec		205	
Saskatchewan		310	
Yukon		15	
	26,405 (81%)	6,035 (19%)	32,440 (100%)
TOTAL	39,065 (84%)	7,555 (16%)	46.620 (100%)

TABLE III

PASSENGER TRAFFIC FLOW BETWEEN THE WESTERN, THE CENTRAL, THE HIGH, AND THE EASTERN ARCTIC, GENERATED EXCLUSIVELY WITHIN THESE AREAS IN 1969.



SUMMARY:

Between West and High Arctic	
Direct..........	80
Between West and Central Arctic	
Via South.......	50
Direct..........	115
Between East and High Arctic	
Direct..........	350
Between East and West Arctic	
Via South.......	30
*Via North.......	15
Via Central.....	--
Between East and Central Arctic	
Via South.......	25
Direct..........	20

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[1] Source: DBS Aviation Statistics, O. & D. Domestic, 1969.

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